ARS-2012PEL
Mirror Smart Plus

User's Manual

— Version: 1.0 —

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Table of Contents

Chapter 1 About SCSIDE 4
1.1 Revolutionary Technology 4
1.2 SCSIDE® Design 5
Chapter 2 Introduction 6
2.1 Overview 6
2.2 Features 6
2.3 Quick Start 7
2.4 Package 7
2.5 Specifications 7
2.6 Compatibility 8
Chapter 3 The Control Panel 10
Chapter 4 Hardware Installation 13
4.1 Installing a SCSI Adapter 13
4.2 Installing ARS-2012PEL 13
4.2.1 Preparation 13
4.2.2 IDE Hard Drive Connection 14
4.2.3 External Power Connection 16
4.2.4 External Cable Connection 17
4.2.5 DIP Switch Setting 18
Chapter 5 Troubleshooting 21
5.1 Basic Troubleshooting 21
5.2 Advanced Troubleshooting 22
5.2.1 Verify the SCSI Adapter 22
5.2.2 Verify ARS-2012PEL 25
Appendix 1 SCSI Adapter Compatibility 27
Appendix 2 Mirror Smart Utility 28

Chapter 1 About SCSIDE

1.1 Revolutionary Technology

SCSIDE® is a revolutionary technology developed by ACARD Technology Corp. It can not only transform IDE data into SCSI type, but also save the expenditures. Through this technology any cheap IDE device can have high-performance SCSI applications. The following examples are simply a little portion of SCSIDE® applications.

1. To transform an IDE hard disk into an external SCSI one for notebook and desktop PC users to back up data.
2. To transform a 50X IDE CD-ROM into a 50X LVD SCSI one. It is an unprecedented technology.
3. To transform your favorite IDE DVD-ROM into LVD SCSI one.
4. To daisy chain multiple SCSIDE® DVD-ROMs to create a DVD-ROM server.
5. To transform a DMA33/66/100/133 hard drive of 5400rpm or 7200rpm into an LVD SCSI one for PC workstations, servers and Unix workstations, servers.

The basic structure of SCSIDE® is a "RAID On Chip" which highly integrates multiple CPUs. This ROC design is resulting from ACARD's years of experiences in the design of IDE, SCSI and RISC CPU chips. The block diagram on the next page shows that ROC has multiple CPUs. Its ROM, RAM, DMA controllers and external ROM interface can be used as the firmware update of flash ROM. ACARD has a perfect firmware technology, too. It makes the transformation of IDE to SCSI really "plug and play". The firmware has been tested on almost all brands of IDE DMA33/66/100/133 HDDs, ATAPI CD-ROMs, DVD-ROMs. Whether your IDE device is an ATA hard drive, CD-ROM, CD-RW or DVD-ROM, you can all plug it and enjoy the advantages of SCSI. With the intelligent firmware design, you don't need to install a

driver into the operating system so as to use SCSIDE® products. In the operating system it is just like a SCSI device.

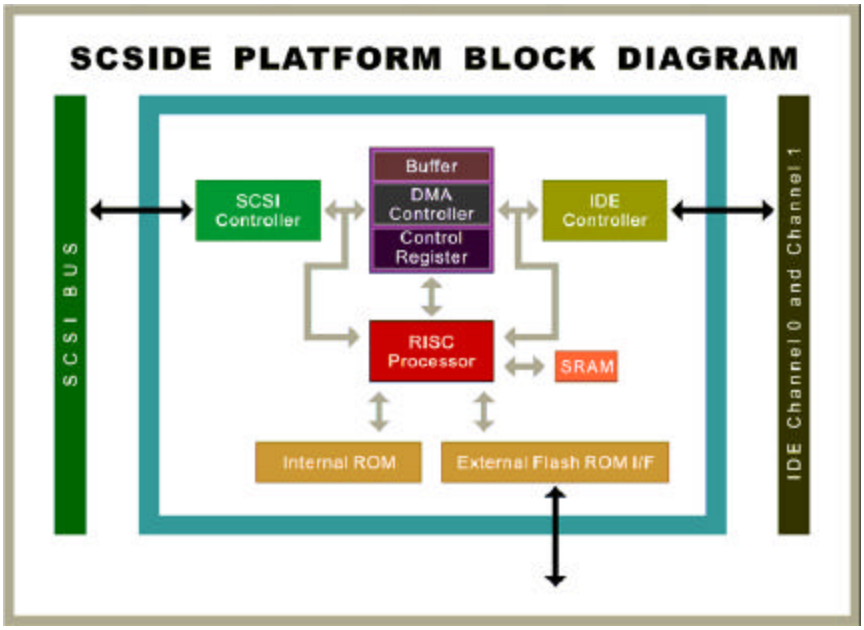


Figure 1-1

1.2 SCSIDE® Design

The objectives of SCSIDE® design are given as follows:

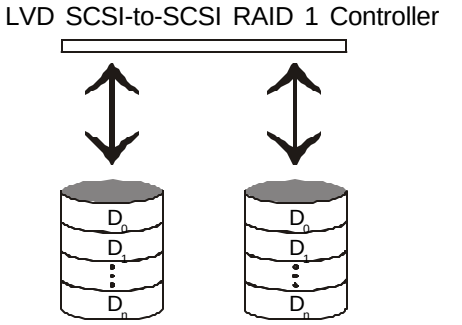
1. Save the expenses of SCSI by using an inexpensive IDE device.
2. Create applicaions like 50X SCSI CD-ROM and high speed SCSI DVD-ROM.
3. Apply "plug and play" to the transformation of IDE device to SCSI one. It is not necessary to install a driver.

We welcome you to be a new member of SCSIDE® and have a good time.

Chapter 2 Introduction

2.1 Overview

ARS-2012PEL LVD (Low Voltage Differential) SCSI RAID 1 System is particularly designed for disk mirroring. It consists of two hard disk drives for duplicating data as Figure 2-1 shows. However, the computer still regards them as a single drive. Via the built-in microcontroller, ARS-2012PEL makes high-level applications more flexible and stable. It can easily transform any IDE device into an LVD SCSI one.



Identical data is recorded on both HDDs

Figure 2-1

2.2 Features

ARS-2012PEL Mirror Smart Plus has the following features.

- Is a standalone LVD SCSI-to-SCSI RAID 1 controller.
- Has an auto-eject handle on the cabinet to eject a failed hard drive.
- Has aluminum & steel heat sink frame design.
- Has an alarm-off resetting button.
- Supports "Big Drives" technology.
- Supports cross-platform operation.
- Supports HOT SWAP.
- Supports multitasking.

- Has lower CPU system loading.
- Has a built-in SOC SCSIDE® engine.

2.3 Quick Start

Please follow the 7 steps given below to use ARS-2012PEL Mirror Smart Plus.
Step 1: Make sure that all cables are connected well to your PC.
Step 2: Take the cabinet out of the Mirror Smart Plus.
Step 3: Put a hard drive into the cabinet and connect it with the internal cable.
Step 4: Replace the cabinet to the Mirror Smart Plus.
Step 5: Make sure that the auto-eject handle on the cabinet is closed.
Step 6: Power on the system.
Step 7: Use the Mirror Smart Plus as a new hard drive device.

2.4 Package

Upon receiving the package of ARS-2012PEL unpack it and check its contents.

- ARS-2012PEL
- A CD containing the driver and the Mirror Smart Utility
- A user's manual
- LVD cable (optional)
- LVD terminator (optional)
- AEC-67160 Ultra 160 SCSI Adapter (optional)

**Please refer to Appendix 2 for the Mirror Smart Utility.

2.5 Specifications

1.ARS-2012PEL Mirror Smart Plus

Materials	Aluminum & steel base, cover, ABS shell and front panel

Temperature	0°C to 70°C for operation -20°C to 85°C for storage
Humidity	15% to 90%
Dimension	Length: 28cm Width: 18cm Height: 16cm

2.AEC-67160 SCSI Adapter (optional)

Please refer to the user's manual of AEC-67160 SCSI Adapter.

2.6 Compatibility

ARS-2012PEL is especially designed for DMA hard drives. It fully supports the following brands of DMA33/66/100/133 hard drives. Besides, it is compatible with various kinds of SCSI cards, and can operate well in Mac or Linux.

- IBM HDD
- MAXTOR HDD
- QUANTUM HDD
- SEAGATE HDD
- Fujitsu HDD
- WESTERN DIGITAL HDD

For details please see the next page.

IBM HDD

DTLA series, DPTA series, DTTA series, DJNA series, 60 GXP, 75 GXP.

MAXTOR HDD

54098U8, 52049U4, 91366U4, 94098U8, 91020U3, 98196H8, 5T020H2.

QUANTUM HDD

FireBall LM series, LC series, LB series, LD series.

FireBall KX series, KA series.

FireBall CX series, CR series, EX series.

FireBall EL series.

SEAGATE HDD

Barracuda IDE series.

Barracuda ATA II 100 series.

ST320430A, ST313620A, ST3240AT, ST38422A, ST36531A.

Fujitsu HDD

MPF-3204AT, MPD-3173AT, MPD-3084AT.

WESTERN DIGITAL HDD

Expert 13BA, Caviar AC14300, Caviar 300BB, Caviar 600AB

Please visit www.acard.com for the newest information.

Chapter 3 The Control Panel

ARS-2012PEL has a control panel composed of 6 LEDs and an alarm-off resetting button. They are defined as follows.

Fan Failure LED: It lights when the fan cannot work properly.

Hard Drive Error or Malfunction LED: It lights when the hard drive is failed.

Hard Drive Access LED: It lights when the system is busy in reading/writing.

Hard Drive Power LED: It indicates if the hard drive is normal.

Rebuilding LED: It lights when you replace a failed hard drive and the data in another drive is being copied into the new drive.

Alarm-Off Resetting Button: Push it to stop buzzing when alarm is activated.

System Power LED: It indicates if the system is normal.

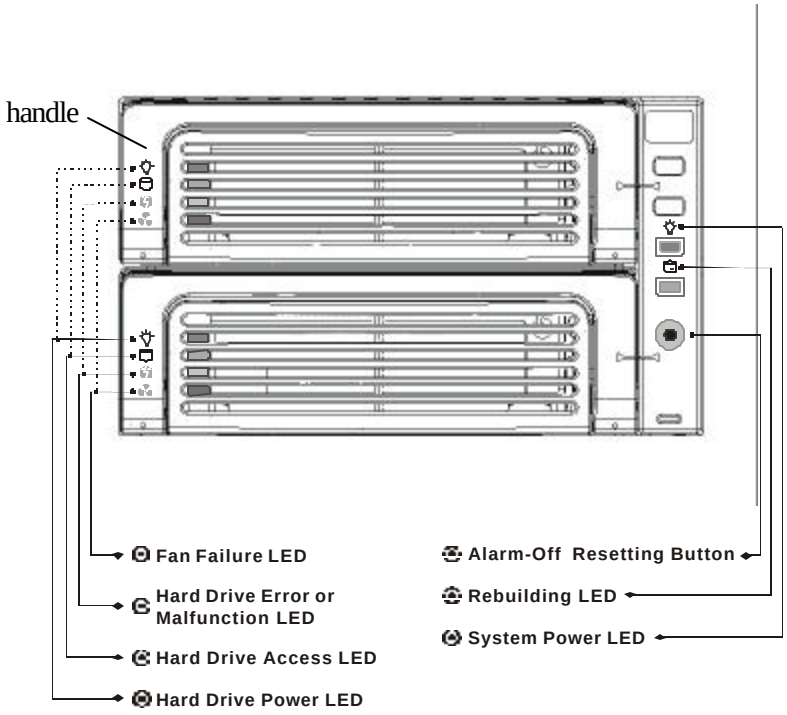


Figure 3-1

NOTICE: Place the handle back to "Close" after installing all devices otherwise the "Alarm" will be activated when power is on.

The control panel of ARS-2012PEL is described in details below.

Figure 3-2

- During normal operation, if the system detects a failed hard drive, the failed drive LED will glitter 10 seconds in alarm. Then, it will keep lighting with handle ejecting. It indicates that the failed drive needs to be replaced.

- After the new drive is installed and plugged, the system will check the new drive. At this moment, LED A , B and C will keep lighting. The currently checked new drive LED will glitter to indicate the hard drive.

- When the new drive is ready, LED A ,B and C will keep lighting, and the new drive LED will keep glittering. Yet, LED A ,B and C will light to indicate that the system is rebuilding data to the new drive.

- When there is only one hard drive in the system, the Mirror Smart will sound a short beep twice in every 8 seconds with LED glittering until another hard drive is supplied.

- If the fan can not work properly, the fan failure LED will glitter with alarm in every second until the "Alarm-Off Resetting Button" is pressed for 0.5 second. Under the circusmstances, please contact the dealer or ACARD distributor.

Chapter 4 Hardware Installation

The hardware installation includes two parts. The first part is the installation of a SCSI adapter, and the second part that of ARS-2012PEL Mirror Smart Plus.

4.1 Installing a SCSI Adapter

The installation of a SCSI adapter is quite easy. If you don't have a SCSI adapter and like to buy the AEC-67160 SCSI Adapter, you may contact with a salesperson of ACARD. According to the manual you can quickly install the SCSI adapter. Then, you need to install its driver, which is contained in the supplied CD.

4.2 Installing ARS-2012PEL

The installation of ARS-2012PEL is divided into several parts such as IDE hard drive connection, internal connection, external power connection, external cable connection, DIP switch setting, etc.

4.2.1 Preparation

Before installing ARS-2012PEL, you need to understand the following important things.

- In the initial installation, if the two hard drives are different in capacity, ARS-2012PEL will take the smaller drive as the standard.
- If the two hard drives are the same in capacity, ARS-2012PEL will take the drive on the upper cabinet as the standard.
- Both hard drives support HOT SWAP.
- In rebuilding, the source drive cannot be removed, but the destination drive can be when Hard Drive Error or Malfunction LED is on.

- When rebuilding finishes, ARS-2012PEL will produce a long beep alarm.
- When HOT SWAP is progressing, the system of ARS-2012PEL must be in the state of "Power On".
- Use Ultra DMA33/66/100/133 HDD to let ARS-2012PEL perform better.

4.2.2 IDE Hard Drive Connection

Before connecting an IDE hard drive to the cabinet of ARS-2012PEL, you have to set the hard drive as "Master" mode by adjusting the jumper setting. In addition, if the hard drive has contained data or installed with a certain version of OS, you had better back up your data first, and install the OS again after connection. The hard drive cannot work without installing the OS again. After connection just treat the IDE hard drive as a new one.

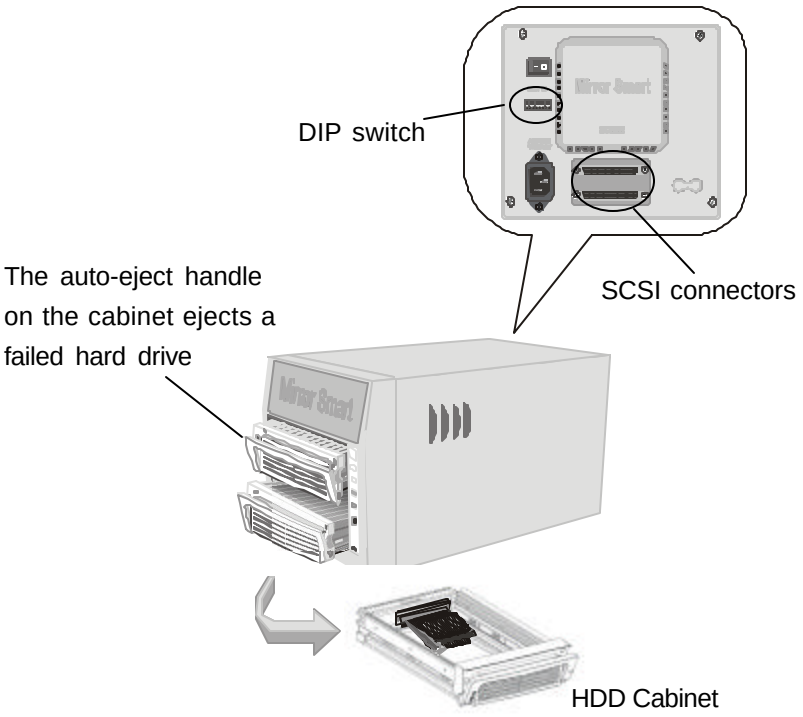


Figure 4-1

Prior to connecting an IDE hard drive to the cabinet , you have to take the following two steps to open the cabinet.

Step 1: Power off the system, and use a driver to open the handle.

Step 2: Hold the handle to pull out the cabinet.

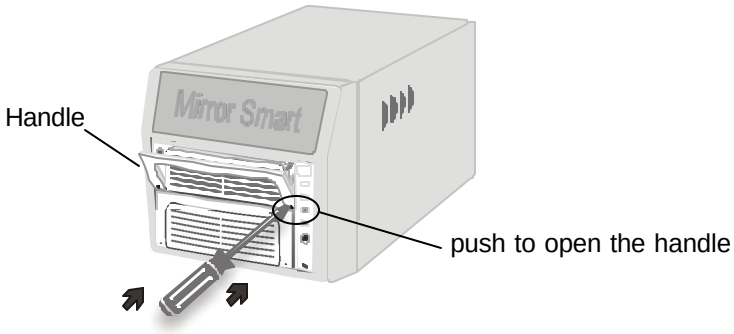


Figure 4-2

> **NOTICE**: The handle is a switch to control the hard drive power, so do not open it arbitrarily during operation.

Follow the 5 steps to connect an IDE hard drive to the cabinet. Please do the job according to Figure 4-3 on page 16.

Step 1: Find out pin 1 of the 40-pin connector on the IDE hard drive.

Step 2: Find out the color line of the IDE cable inside the cabinet, which indicates pin 1 of the 40-pin connector.

Step 3: Connect the IDE cable to the IDE hard drive by pin 1 to pin 1.

Step 4: Connect the 4-pin power connector inside the cabinet to the IDE hard drive's 4-pin connector.

Step 5: Finally put the cabinet back to ARS-2012PEL.

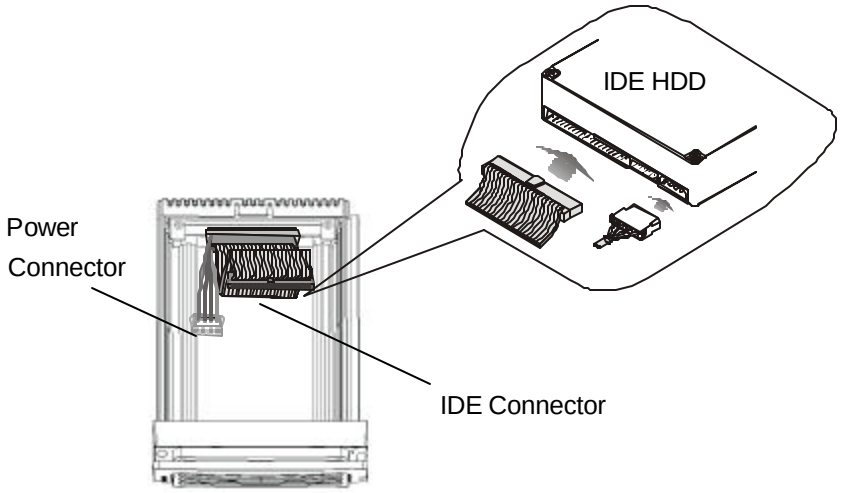


Figure 4-3

4.2.3 External Power Connection

After connecting the IDE hard drive to the cabinet of ARS-2012PEL, you can connect the power cord as shown in Figure 4-4.

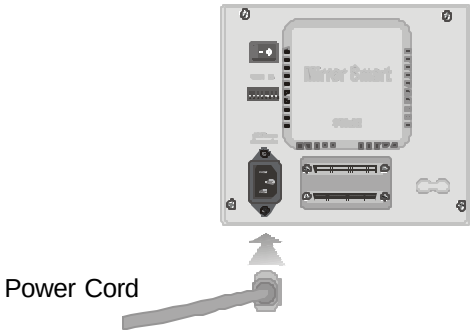


Figure 4-4

4.2.4 External Cable Connection

Now you can follow the directions below to connect your ARS-2012PEL(s).

Step 1: Identify the LVD SCSI cable.

Step 2: Insert one end of the LVD SCSI cable into the host adapter's LVD connector.

Step 3: Insert the other end of the LVD SCSI cable into ARS-2012PEL's external SCSI connector.

Step 4: Enable the terminator of ARS-2012PEL. Please see Figure 4-5 for the whole process.

Step 5: If you want to connect more ARS-2012PELs, you can take another SCSI cable, insert it into the present ARS-2012PEL's second SCSI connector.

Step 6: Insert the other end of the SCSI cable into the next ARS-2012PEL's first SCSI connector. Repeat step 5 to 6 to connect other ARS-2012PELs.

Step 7: Remember to enable the terminator of the last ARS-2012PEL. Please see Figure 4-6 for the whole process.

Connection of one device

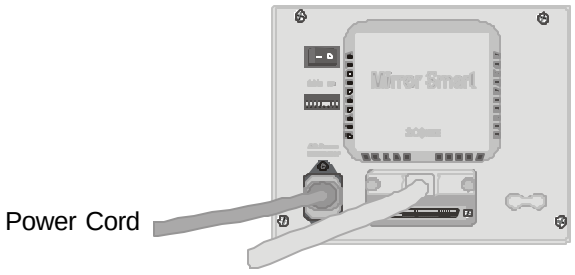


Figure 4-5

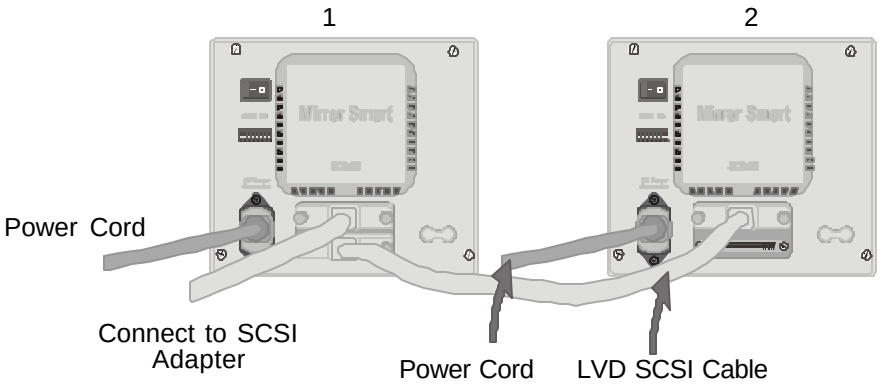


Figure 4-6

4.2.5 DIP Switch Setting

The DIP switch setting includes two parts: enabling the terminator of ARS-2012PEL; giving a unique SCSI ID number to the Mirror Smart Plus.

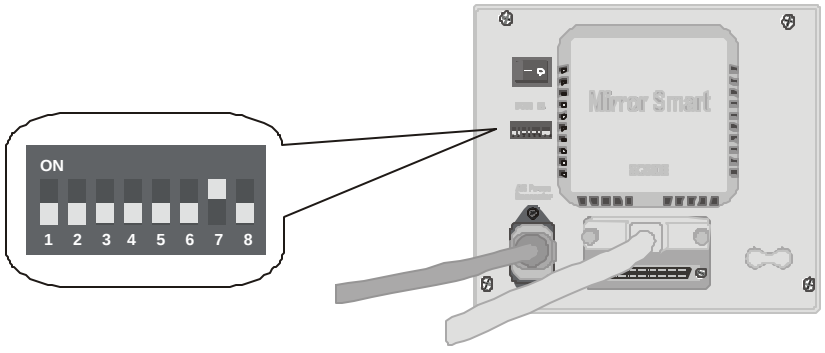
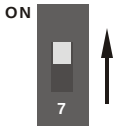


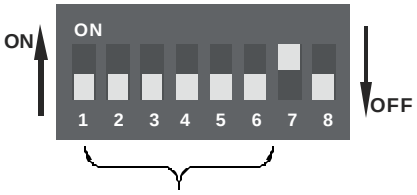
Figure 4-7

Please follow the instructions below to set DIP switch properly.

1. Enable/Disable the Terminator: Enable the terminator of ARS-2012PEL or that of the last one in a daisy chain. The default is ON.



2. SCSI ID Number: Give a unique SCSI ID number to each ARS-2012PEL in a daisy chain according to the following figure. Even if there is only one ARS-2012PEL, you still need to give it an ID number.



Default: All OFF (ID=0)

1 ➔ON-SCSI ID 1
2 ➔ON-SCSI ID 2
3 ➔ON-SCSI ID 4
4 ➔ON-SCSI ID 8
5 ➔Reserve
6 ➔Reserve
7 ➔ON-Terminator Enable
8 ➔Reserve

Figure 4-8

For the illustration of SCSI ID number for ARS-2012PEL, please see Figure 4-9 on the next page.

ID=0 (Default)		**ID=1**	
ID=2		**ID=3**	
ID=4		**ID=5**	
ID=6		**ID=7**	**N/A**
ID=8		**ID=9**	
ID=10		**ID=11**	
ID=12		**ID=13**	
ID=14		**ID=15**	

Figure 4-9

Chapter 5 Troubleshooting

This chapter is divided into two main sections: basic troubleshooting and advanced troubleshooting.

5.1 Basic Troubleshooting

When your ARS-2012PEL cannot function normally, please examine it according to the points listed below.

1. Check the power status
Check if the power status is ON.

2. Check the IDE HDD
Check if the IDE hard drives are in the Master mode.

3. Check the host adapter
Check if the host adapter, AEC-67160, is inserted securely onto the motherboard.

4. Check all connectors and cables
Check if ARS-2012PEL's power connector, SCSI connectors, the IDE hard drives' IDE connectors and power connectors have good quality. Their pins are not bent. Then, check if power cords and SCSI cables are connected se-

5.2 Advanced Troubleshooting

Let's explain the troubleshooting of ARS-2012PEL in the operating system Windows 2000. At first, set the ID number of the SCSI adapter, AEC-67160, as 0.

5.2.1 Verify the SCSI Adapter

Check if the displayed device on the list of devices is just the installed SCSI adapter. The steps of entering "Device Manager" are as follows.

Step 1. Double click "My Computer". Select "Control Panel".

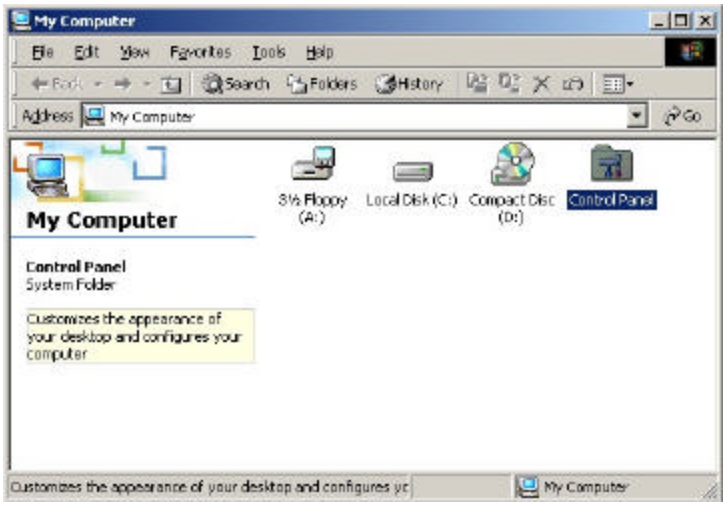


Figure 5-1

Step 2. Double click "System".

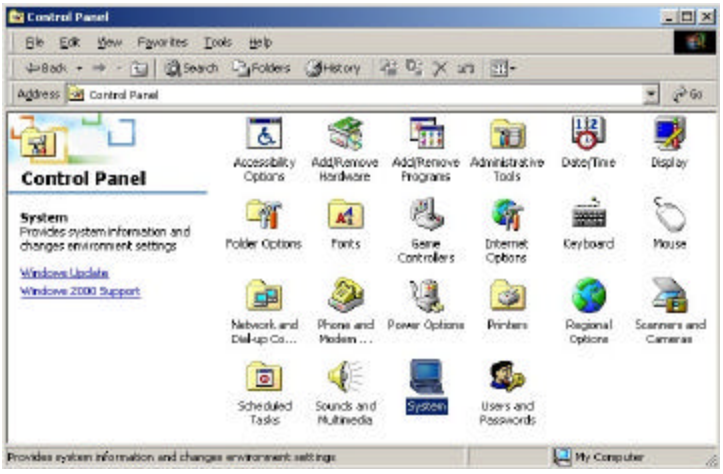


Figure 5-2

Step 3. Select "Hardware" in "System Properties". Then, click "Device Manager".

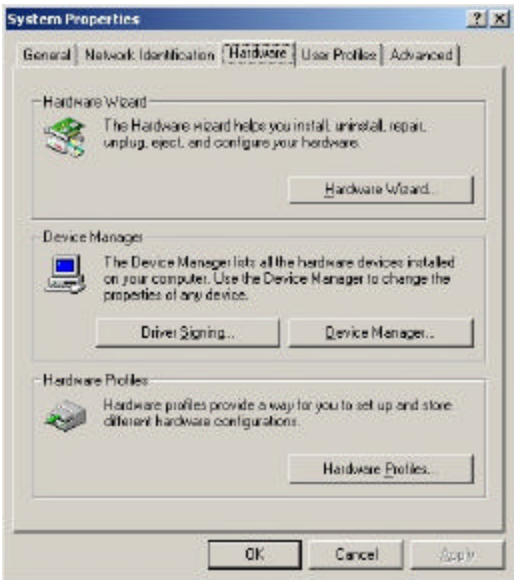

System Properties
General
Network Identification
Hardware
User Profiles
Advanced
Hardware Wizard
The Hardware Wizard helps you install, uninstall, repair, unplug, eject, and configure your hardware.
Hardware Wizard...
Device Manager
The Device Manager lists all the hardware devices installed on your computer. Use the Device Manager to change the properties of any device.
Driver Signing...
Device Manager...
Hardware Profiles
Hardware profiles provide a way for you to set up and store different hardware configurations.
Hardware Profiles...
OK
Cancel
Apply

Figure 5-3

Step 4. Double click "SCSI and RAID controllers" to check if AEC-67160 adapter is installed well.

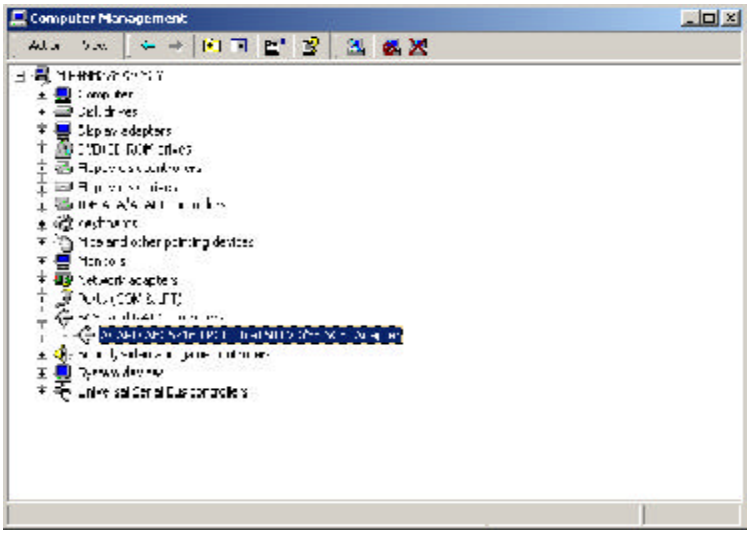


Figure 5-4

5.2.2 Verify ARS-2012PEL

If you can find ARS-2012PEL, the Mirror Smart Plus which you have installed with AEC-67160 in "Device Manager", AEC-67160 is installed successfully. If you cannot find, but see a yellow question mark, inspect the IDE connector on AEC-67160. It could be a bad connection or the device's malfunction. Please check your Mirror Smart Plus as follows.

Step 1. Click "Disk drives" to show your hard disk drives.

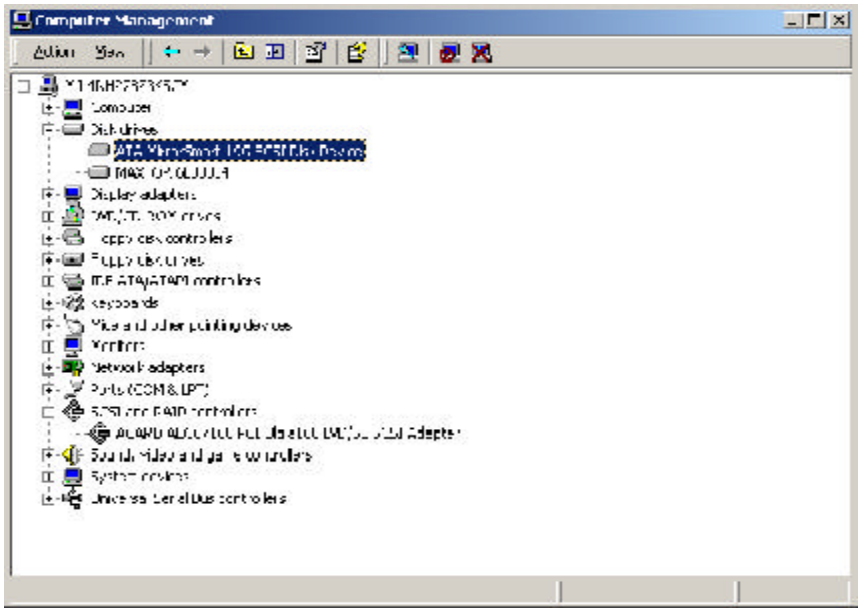


Figure 5-5

Step 2. Double click "ATA MirrorSmart 19G SCSI Disk Device". Then, click "General", and in "Device Status" see if ARS-2012PEL, the Mirror Smart Plus, is working properly.

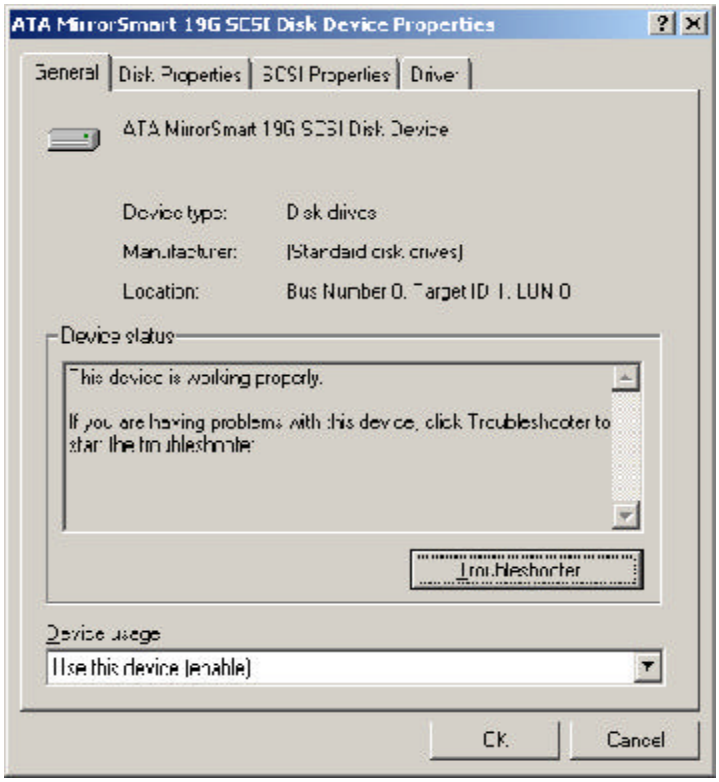


Figure 5-6

Appendix 1 SCSI Adapter Compatibility

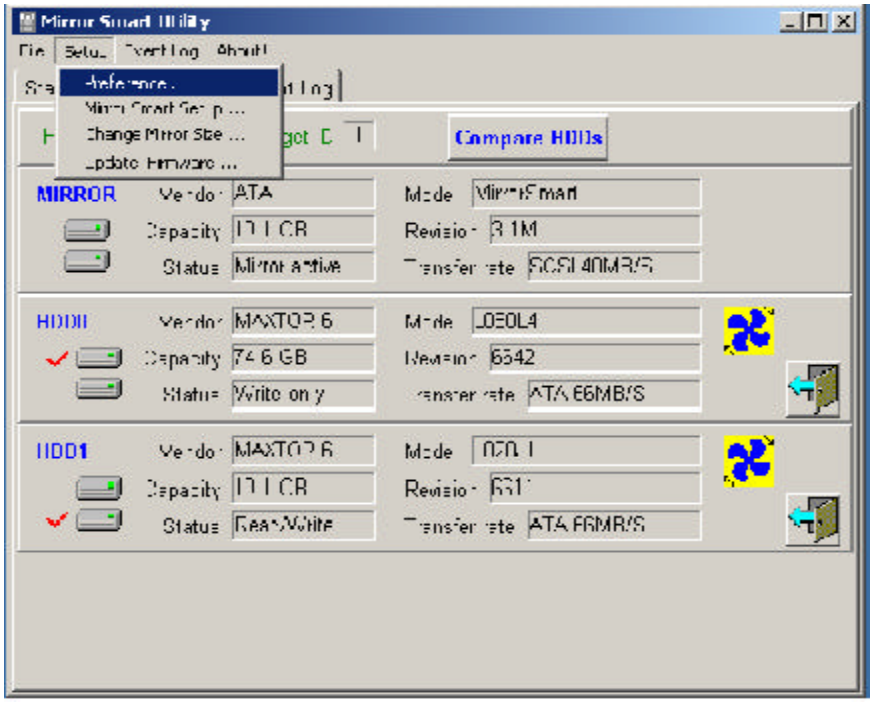
All the SCSI adapters listed below can be used together with ARS-2012PEL, the Mirror Smart Plus.

ACARD AEC-67160
Adaptec ASC 29160
Adaptec ASC 39160
Adaptec AHA 2940U2W
Adaptec AHA 2940UW
Initio 9100UW
Tekram DC-390U2W(53C895)
Tekram DC-390U3W
Tekram 390UF LSI Symbios 53C875 Ultra Wide SCSI Controller

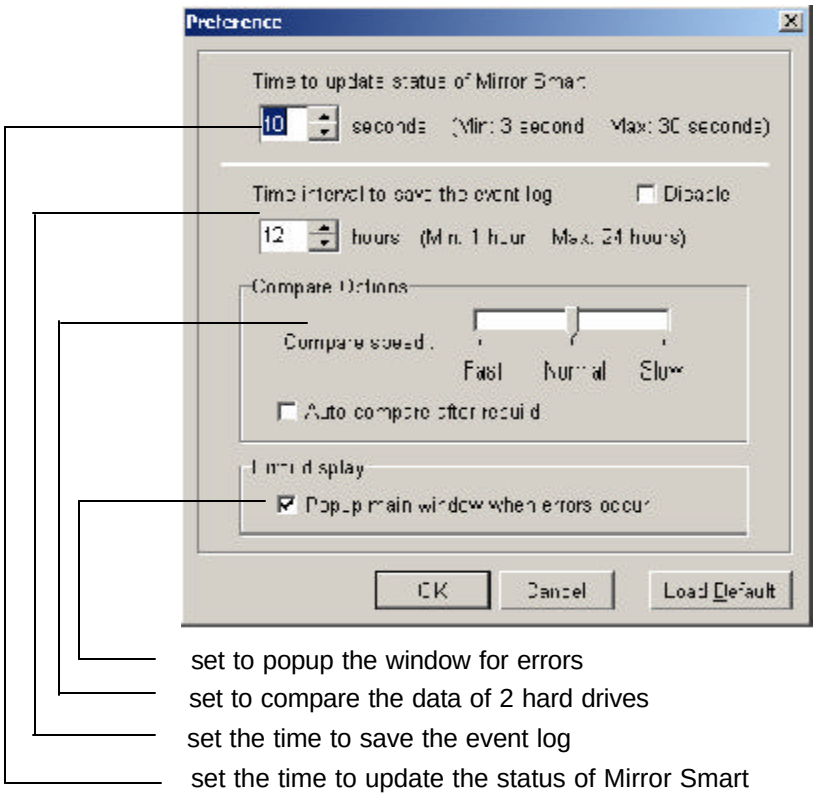
Appendix 2 Mirror Smart Utility

The Mirror Smart Utility is used to manage and control ARS-2012PEL. With it you can easily set, change and check all things concerning the situation of hard drives.

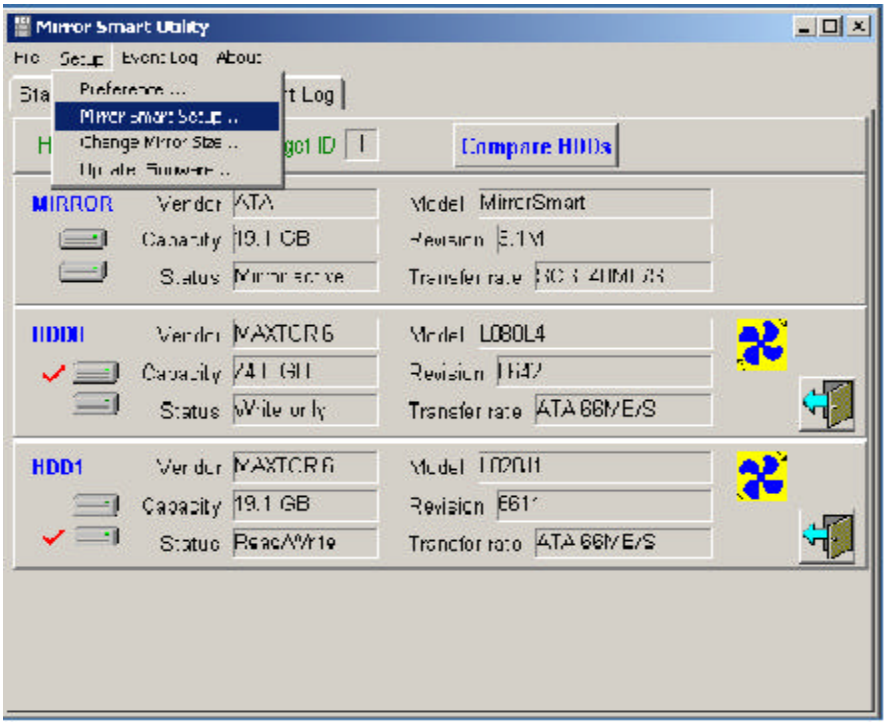
After entering the utility, if you want to change some basic settings, you can click "Setup" and select "Preference" as shown below.



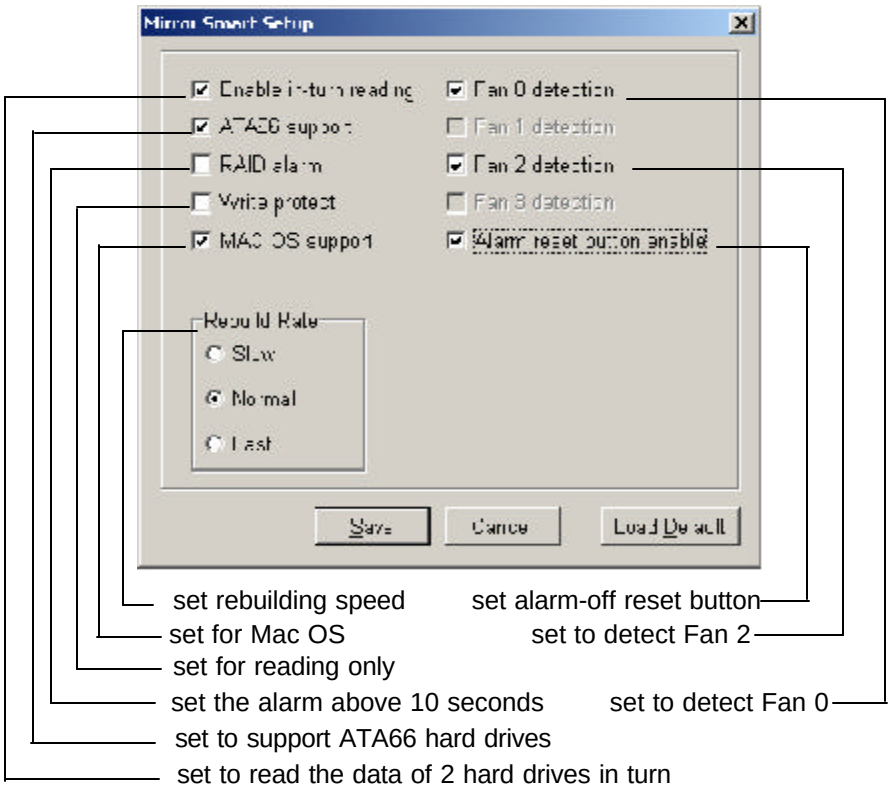
The main items in "Preference" are explained as follows.



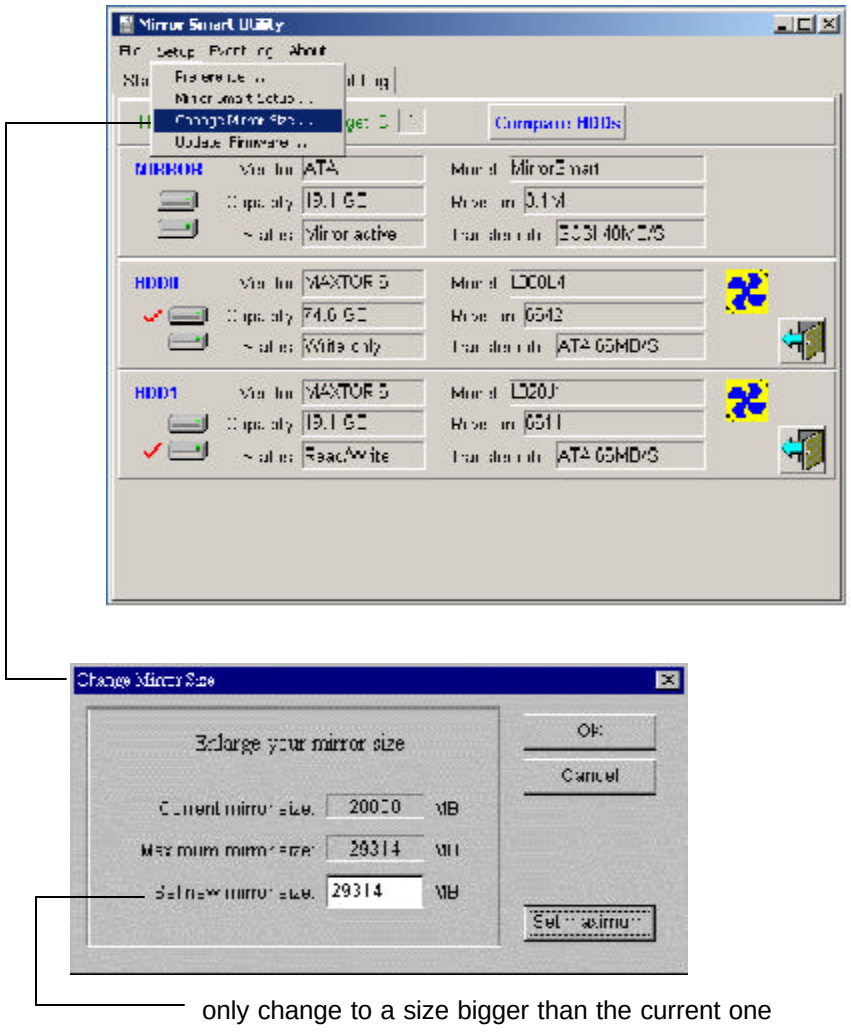
If you want to set the functions of Mirror Smart, you can click "Setup" and select "Mirror Smart Setup" as shown below.



The main items in "Mirror Smart Setup" are explained as follows.

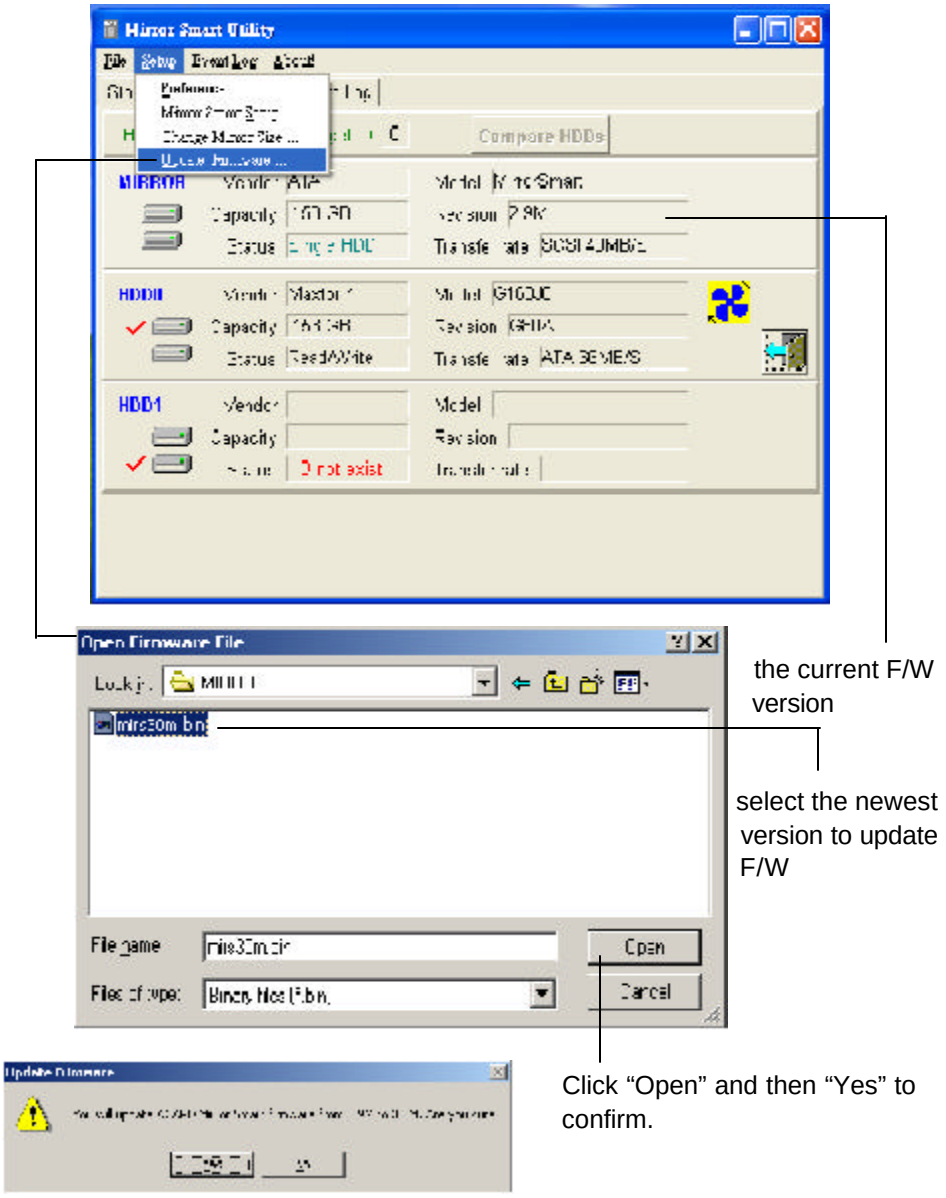


If you want to change the size of Mirror Smart, you can click "Setup" and select "Change Mirror Size" as shown below.



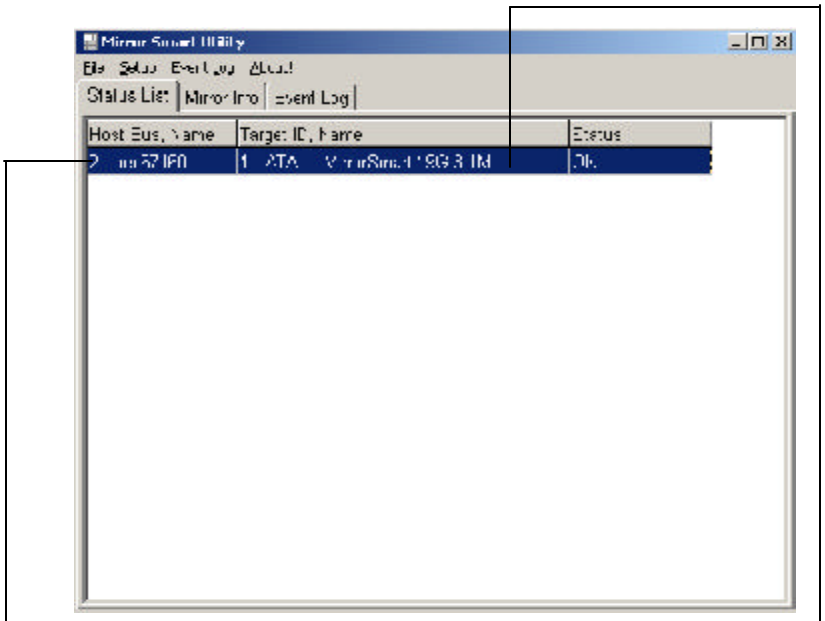
only change to a size bigger than the current one

If you want to update the firmware of Mirror Smart, you can click "Setup" and select "Update Firmware" as shown below.

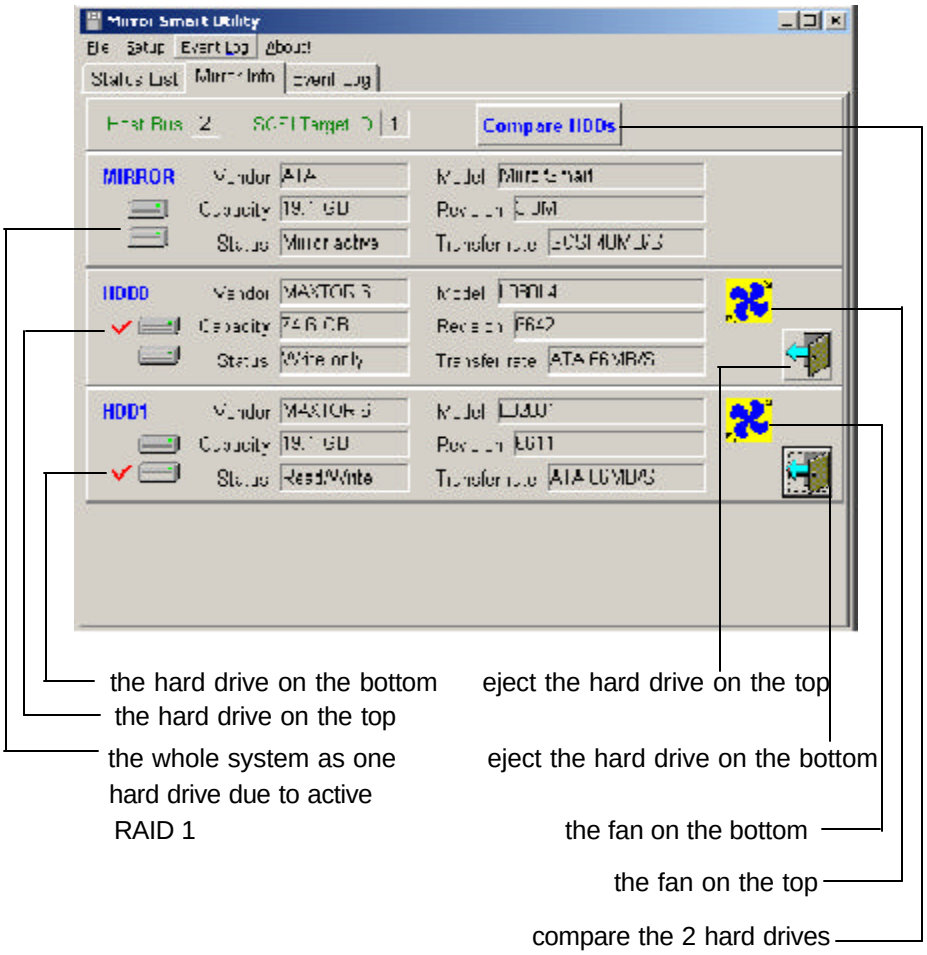


If you want to know the product version of Mirror Smart Utility, you can click "About!".

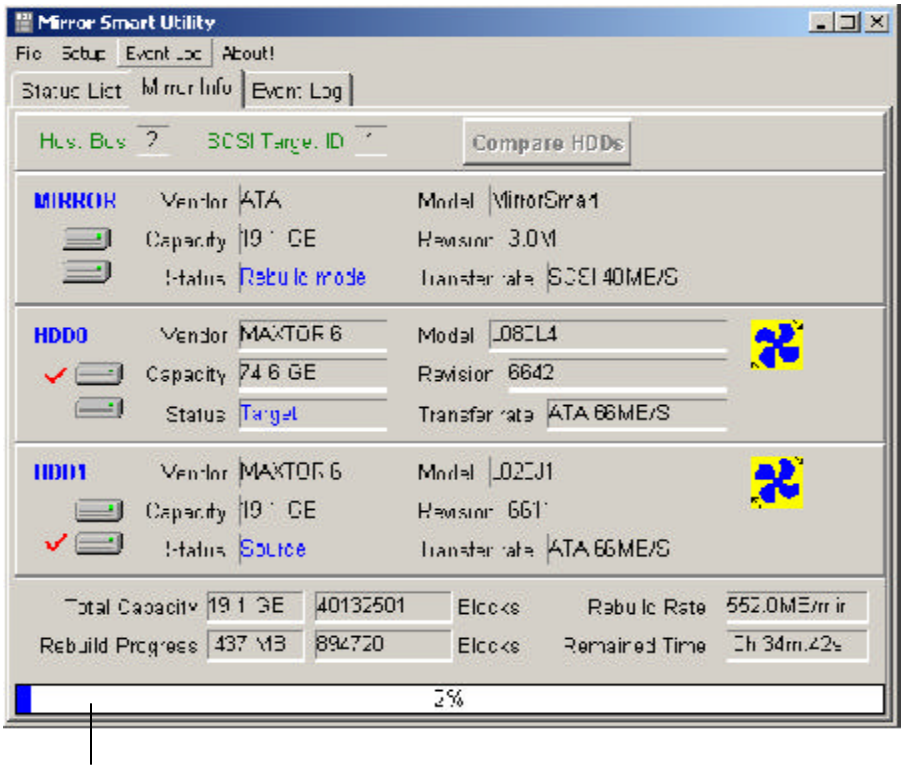
Click "Status List" to see the status of Mirror Smart.



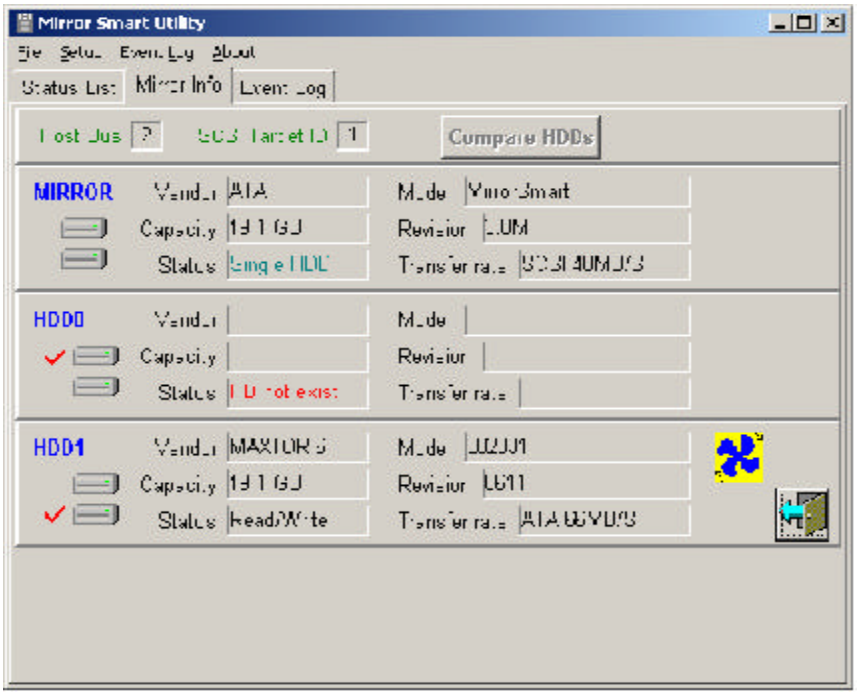
Click "Mirror Info" to see all the information about hard drives.


Compare HDDs
MIRROR
HDD0
HDD1
the hard drive on the bottom
the hard drive on the top
the whole system as one hard drive due to active RAID 1
eject the hard drive on the top
eject the hard drive on the bottom
the fan on the bottom
the fan on the top
compare the 2 hard drives

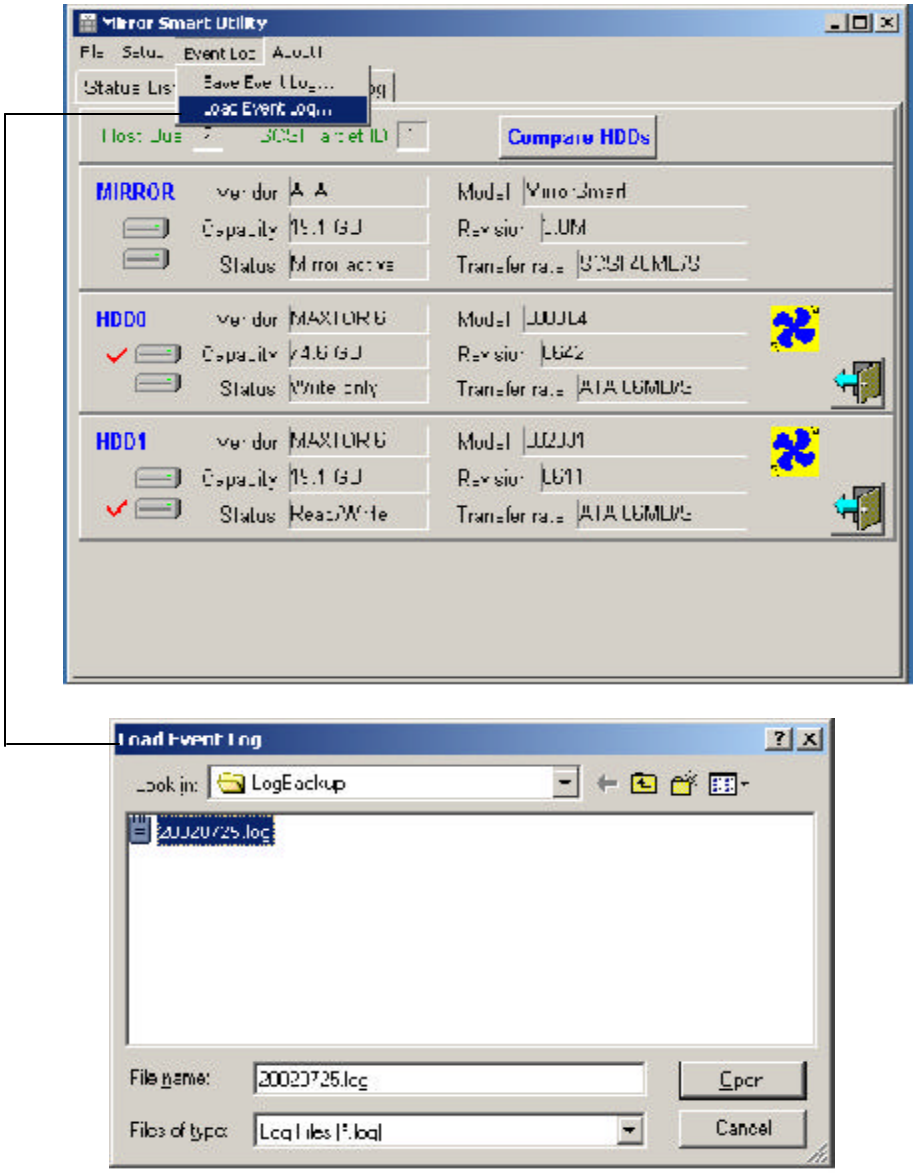
Click "Compare HDDs" to see if the Source HDD and the Target HDD contain the same data. The percentage bar on the bottom of the following figure shows the process of comparison. It is also used to indicate the process of rebuilding.



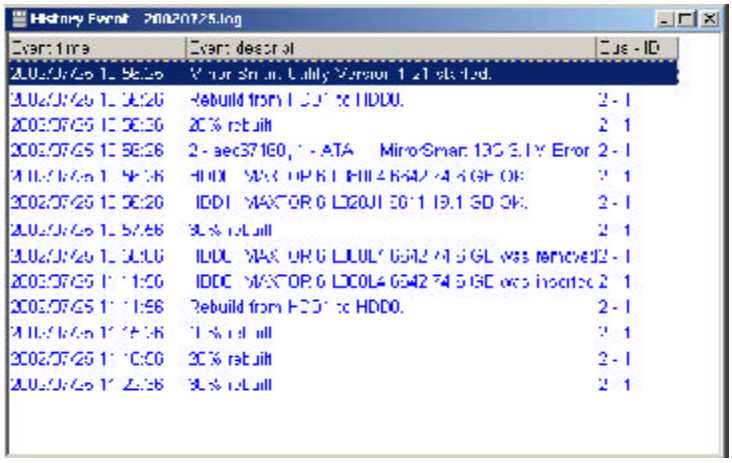
If a hard drive is detected as not existing or having an error, the status will be shown as the following figure.



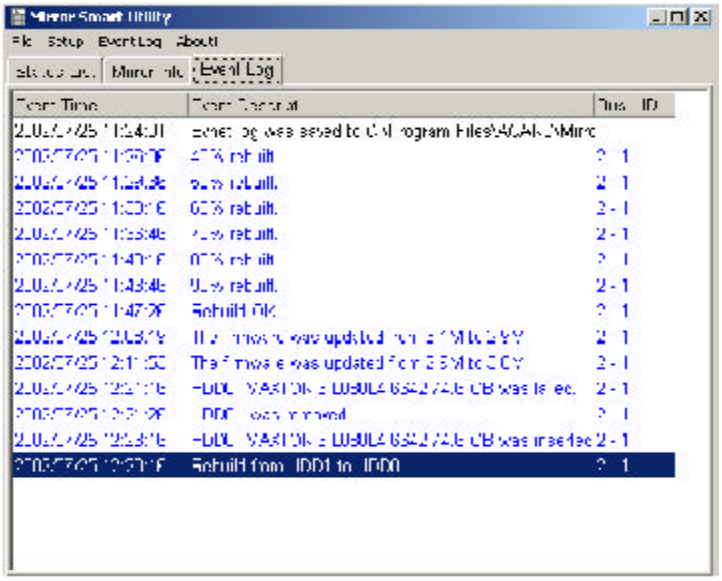
If you want to see the record of an event log, click "Load Event Log" under "Event Log". Then, choose the file you need.



Click the file to see as the following figure shows.



The "Event Log" describes the status of every event time. It is helpful for you to solve problems when they occur.



Technical Support Form

Email: **support@acard.com**
http://www.acard.com

Model:	ARS-2012PEL	**F/W Version:**	
System Configuration			
Motherboard			
BIOS version			
SCSI adapter			
Chipset			
Memory			
Display card			
Other I/O card			
OS version			
Hard Disk			
Hard Disk Model/type			
Capacity			
IDE Device Connection			
CD-ROM model			
CD-R model MO or Removable			
Others			